

WHAT IS CLAIMED IS:

1. A brown oxide pretreatment composition for cleaning a copper surface and improving adhesion of a polyimide surface, comprising:

5 5~15g/L of an amine;

190~210g/L of a hydroxide compound;

at least one additive selected from 3~6g/L of a cleaner adjuvant, 0.1~5g/L of a antifoaming agent and 1~10g/L of a precipitation inhibitor; and

10 the balance of water.

2. The brown oxide pretreatment composition for cleaning a copper surface and improving adhesion of a polyimide surface according to claim 1, wherein the amine is selected from the group consisting of monoethanolamine (MEA), diethanolamine (DEA), triethanolamine (TEA), 2-aminoethanol, N,N-bis-2-hydroxypropylethanolamine, N-oleoylethanolamine and mixtures thereof.

3. The brown oxide pretreatment composition for cleaning a copper surface and improving adhesion of a polyimide surface according to claim 1, wherein the hydroxide compound is selected from the group consisting of sodium hydroxide (NaOH), potassium hydroxide (KOH), barium

hydroxide (BaOH), ammoniumhydroxide,  
tetramethylammoniumhydroxide, tetraethylammoniumhydroxide,  
tetrapropylammoniumhydroxide and mixtures thereof.

5           4. The brown oxide pretreatment composition for  
cleaning a copper surface and improving adhesion of a  
polyimide surface according to claim 1, wherein the cleaner  
adjuvant is at least one compound selected from the group  
consisting of gluconic acid soda, polyglycol, ethoxylated  
10 fatty alcohol, polyethoxylated monoalkanolamide, EO/PO block  
copolymer and mixtures thereof.

5           5. The brown oxide pretreatment composition for  
cleaning a copper surface and improving adhesion of a  
polyimide surface according to claim 1, wherein the  
15 antifoaming agent is an alkylphosphate or fatty acid sulfate.

20           6. The brown oxide pretreatment composition for  
cleaning a copper surface and improving adhesion of a  
polyimide surface according to claim 1, wherein the  
precipitation inhibitor is selected from the group  
consisting of N-methyl-2-pyrrolidone, N-cyclohexyl-2-  
pyrrolidone, 2-pyrrolidone, dimethylformamide, dimethyl  
acetamide, tetrahydrofuran, acetonitrile, dioxane, alcohol  
25 and mixtures thereof.

7. A method for improving adhesion of a polyimide surface by applying the brown oxide pretreatment composition to a brown oxide process, comprising the steps of:

5       a) treating a printed circuit board with a brown oxide pretreatment composition for cleaning a copper surface and improving adhesion of a polyimide surface;

          b) water-washing the printed circuit board of a);

          c) pre-dipping the printed circuit board of b);

10       d) forming a conversion coating on the printed circuit board of c);

          e) water-washing the printed circuit board of d); and

          f) drying the printed circuit board of e).

15       8. A method for improving adhesion of a polyimide surface by applying the brown oxide pretreatment composition to a brown oxide process according to claim 7, further comprising a water-washing step following the pre-dipping step.

20       9. A method for improving adhesion of a polyimide surface by applying the brown oxide pretreatment composition to a brown oxide process according to claim 7, wherein the step a) of treating a printed circuit board with a brown  
25       oxide pretreatment composition is carried out at 30~90°C for

10 seconds~10 minutes.

10. A method for improving adhesion of a polyimide surface by applying the brown oxide pretreatment composition to a brown oxide process according to claim 7, wherein the brown oxide pretreatment composition for cleaning a copper surface and improving adhesion of a polyimide surface used in step a) comprises:

5~15g/L of an amine;

190~210g/L of a hydroxide compound;

at least one additive selected from 3~6g/L of a cleaner adjuvant, 0.1~5g/L of a antifoaming agent and 1~10g/L of a precipitation inhibitor; and

the balance of water.

11. A method for improving adhesion of a polyimide surface by applying the brown oxide pretreatment composition to a brown oxide process according to claim 10, wherein the amine is selected from the group consisting of monoethanolamine (MEA), diethanolamine (DEA), triethanolamine (TEA), 2-aminoethanol, N,N-bis-2-hydroxypropylethanolamine, N-oleoylethanolamine and mixtures thereof.

12. A method for improving adhesion of a polyimide

surface by applying the brown oxide pretreatment composition to a brown oxide process according to claim 10, wherein the hydroxide compound is selected from the group consisting of sodium hydroxide (NaOH), potassium hydroxide (KOH), barium hydroxide (BaOH), ammoniumhydroxide, tetramethylammoniumhydroxide, tetraethylammoniumhydroxide, tetrapropylammoniumhydroxide and mixtures thereof.

13. A method for improving adhesion of a polyimide surface by applying the brown oxide pretreatment composition to a brown oxide process according to claim 10, wherein the cleaner adjuvant is at least one compound selected from the group consisting of gluconic acid soda, polyglycol, ethoxylated fatty alcohol, polyethoxylated monoalkanolamide, EO/PO block copolymer and mixtures thereof.

14. A method for improving adhesion of a polyimide surface by applying the brown oxide pretreatment composition to a brown oxide process according to claim 10, wherein the antifoaming agent is an alkylphosphate or fatty acid sulfate.

15. A method for improving adhesion of a polyimide surface by applying the brown oxide pretreatment composition to a brown oxide process according to claim 10, wherein the precipitation inhibitor is selected from the group

consisting of N-methyl-2-pyrrolidone, N-cyclohexyl-2-pyrrolidone, 2-pyrrolidone, dimethylformamide, dimethyl acetamide, tetrahydrofuran, acetonitrile, dioxane, alcohol and mixtures thereof.